

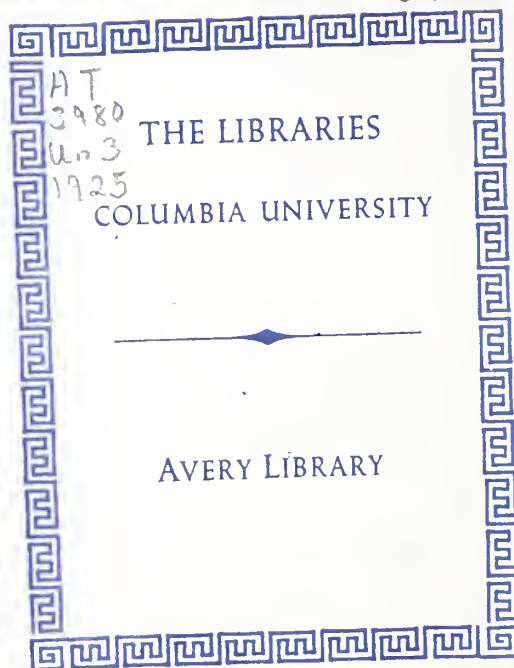
# Architectural & Ornamental HANDBOOK



CHARLES H. ANDERSON

Published by the American Architectural Association, 1863

Classics



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1925

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## FOREWORD

**T**HE use of lead for building purposes is not new. Many of the world's architectural masterpieces enriched by its use stand today, after centuries of wear, mute evidence of the permanence and beauty of lead.

Until the introduction of *HOYT HARDLEAD* the only lead available was soft lead. While possessing many worthy qualities soft lead has the disadvantage of low physical strength which renders its use for general roofing purposes impractical.

*HOYT HARDLEAD* has a much greater tensile strength than soft lead which permits its use in comparatively thin sheets making it thoroughly practical and adaptable to modern building construction.

*HOYT HARDLEAD* can be stamped, formed or cast in any shape desired.

*HOYT HARDLEAD* when exposed to the atmosphere takes on a soft gray, non-staining patina that brings out the true value of adjacent materials and gives a balance to these materials that can not be obtained with other metals. It will lend dignity and character to any structure where permanence and beauty is desired.

*HOYT HARDLEAD* can be used for all building purposes where it is practical to use sheet metal.

GIFT  
OF  
MRS. CHARLES M. HART

## Partial List of Hoyt Hardlead Installations

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<i>Name of Job</i>	<i>Location</i>	<i>Architect</i>
Prudential Life Insurance Building	Newark, N. J.	Cass Gilbert, New York, N. Y.
West Virginia State Capitol	Charleston, W. Va.	Cass Gilbert, New York, N. Y.
Chase Dispensary	Waterbury, Conn.	Cass Gilbert, New York, N. Y.
Chamber of Commerce	Washington, D. C.	Cass Gilbert, New York, N. Y.
James Scott Memorial	Belle Isle, Detroit, Mich.	Cass Gilbert, New York, N. Y.
Marshall Field, 3rd Estate	Huntington, L. I.	John Russell Pope, New York, N. Y.
Moses Taylor Residence	Portsmouth, R. I.	John Russell Pope, New York, N. Y.
School of Business Columbia University	New York, N. Y.	McKim, Mead & White, New York, N. Y.
St. George's School	Newport, R. I.	McKim, Mead & White, New York, N. Y.
Women's Nat'l Tennis & Golf Club House	Glen Head, L. I.	McKim, Mead & White, New York, N. Y.
C. Smithers Residence	White Plains, N. Y.	Donn Barber, New York, N. Y.
H. E. Manville Residence	Pleasantville, N. Y.	Donn Barber, New York, N. Y.
Frank Nobbe Residence	St. Albans, L. I.	Donn Barber, New York, N. Y.
Grassy Sprain Golf Club	White Plains, N. Y.	Donn Barber, New York, N. Y.
Hartford Times Building	Hartford, Conn.	Donn Barber, New York, N. Y.
New York Cotton Exchange	New York, N. Y.	Donn Barber, New York, N. Y.
First Presbyterian Church	Utica, N. Y.	Cram & Ferguson, Boston, Mass. Rushmer & Jennison, Utica, N. Y. Associates
St. George's Chapel	Newport, R. I.	Cram & Ferguson, Boston, Mass.
Cathedral St. John The Divine	New York, N. Y.	Cram & Ferguson, Boston, Mass.
Church of the Sacred Heart	Jersey City, N. J.	Cram & Ferguson, Boston, Mass.
John Hays Hammond Estate	Gloucester, Mass.	Frohman, Robb & Little, Boston, Mass.
National Cathedral	Mt. St. Albans Washington, D. C.	Frohman, Robb & Little, Boston, Mass.
University of Michigan	Ann Arbor, Mich.	York & Sawyer, New York, N. Y.
Federal Reserve Bank	New York, N. Y.	York & Sawyer, New York, N. Y.
Bowery Savings Bank	New York, N. Y.	York & Sawyer, New York, N. Y.
Vincent Astor Residence	Port Washington, L. I.	Delano & Aldrich, New York, N. Y.



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<i>Name of Job</i>	<i>Location</i>	<i>Architect</i>
Chicago Tribune Tower	Chicago, Ill.	John Mead Howells— Raymond M. Hood, New York, N. Y.
Delaware & Atlantic Telephone Co. Building	Princeton, N. J.	John T. Windrim, Philadelphia, Pa.
Ellis Cottages-Ellis College	Philadelphia, Pa.	John T. Windrim, Philadelphia, Pa.
Alexander Hamilton Rice Residence	New York, N. Y.	Horace Trumbauer, Philadelphia, Pa.
✓ F. E. Dixon Residence	Elkins Park, Pa.	Horace Trumbauer, Philadelphia, Pa.
Connecticut College for Women	New London, Conn.	Chas. A. Platt, New York, N. Y.
H. E. Manville Farm Buildings	Pleasantville, N. Y.	Alfred Hopkins, New York, N. Y.
Dennison University	Granville, Ohio	Arnold W. Brunner, New York, N. Y.
Royal Bermudiana Hotel	Hamilton, Bermuda	Warren & Wetmore, New York, N. Y.
Mausoleum	Kansas City, Mo.	Sidney Lovell, Chicago, Ill.
Fairlawn Mausoleum	Oklahoma City, Okla.	Sidney Lovell, Chicago, Ill.
Robert Law Residence and Garage	Port Chester, N. Y.	Dwight J. Baum, Riverdale, N. Y.
Edward Kauffman Residence	Pittsburgh, Penna.	Benno Janssen, Pittsburgh, Pa.
Longue Vue Club	Pittsburgh, Pa.	Benno Janssen, Pittsburgh, Pa.
Washington Loan & Trust Co.	Washington, D. C.	A. B. Heaton, Washington, D. C.
Kenyon College	Gambier, Ohio	Abram Garfield, Cleveland, Ohio
Monument to Music	Providence, R. I.	Bellows & Aldrich, Boston, Mass.
Chemical Laboratory	Clinton, N. Y.	Bagg & Newkirk, Utica, N. Y.
Hamilton College		
Utica Golf Club	Utica, N. Y.	Bagg & Newkirk, Utica, N. Y.
Walter E. Kelly Residence	Riverdale, N. Y.	Geo. B. Post & Son, New York, N. Y.
Archæological Building, Ohio State University	Columbus, Ohio	Prof. J. H. Bradford, Columbus, Ohio
Administration Building, Ohio State University	Columbus, Ohio	Prof. J. H. Bradford, Columbus, Ohio
Lloyd Frank Residence	Portland, Oregon	Herman Brookman, Portland, Oregon
Ford Motor Company	Detroit, Mich.	Albert Kahn, Detroit, Mich.
Packard Motor Company	Detroit, Mich.	Albert Kahn, Detroit, Mich.
U. S. Post Office and Customs House	Oswego, N. Y.	U. S. Government, Washington, D. C.
U. S. Post Office	Philadelphia, Pa.	U. S. Government, Washington, D. C.
U. S. Post Office	Beaver Falls, Pa.	U. S. Government, Washington, D. C.
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# Conductor Heads, Conductor Pipe, Gutters and Fittings

IMPORTANT—To insure the use of proper materials, correct weights and expert workmanship, specify as follows:

ALL HOYT HARDLEAD SHEETS, LEADER HEADS, LEADER PIPE, LEADER BANDS, GUTTERS, GOOSENECKS SHALL BE MANUFACTURED BY THE UNITED LEAD COMPANY,  
111 BROADWAY, NEW YORK, N. Y.

CONDUCTOR HEADS herein illustrated are made of rough cast HOYT HARDLEAD. Patterns are in stock and can be duplicated promptly. We are prepared to execute Heads in accordance with architect's special designs.

CONDUCTOR PIPE is manufactured in three types, rough cast, seamless and rolled sheet.

*Rough Cast* pipe is made from HOYT HARDLEAD cast sheets with a rough surface finish. The pipe can be formed to any size desired. The vertical seam which is placed on the back of the pipe is a burnt seam. Several designs of ornamental pipe are illustrated but we are prepared to execute ornamental conductor pipe from architect's special design.

*Seamless* pipe is made from HOYT HARDLEAD and is without vertical seam. This pipe is carried in stock in sizes shown on Plate 27. It can be furnished smooth or finished with a hammered or rough surface, as desired.

*Rolled Sheet* pipe is made of HOYT HARDLEAD rolled sheet formed to shapes and sizes shown on Plate 28. This pipe is furnished only in smooth finish.

CONDUCTOR PIPE FITTINGS, Goosenecks, Offsets and Elbows are made to order from measurements furnished. These fittings are made for all types and sizes of conductor pipe illustrated and are finished to correspond with type of pipe.

GUTTERS are manufactured in two types, rough cast and rolled sheet HOYT HARDLEAD.

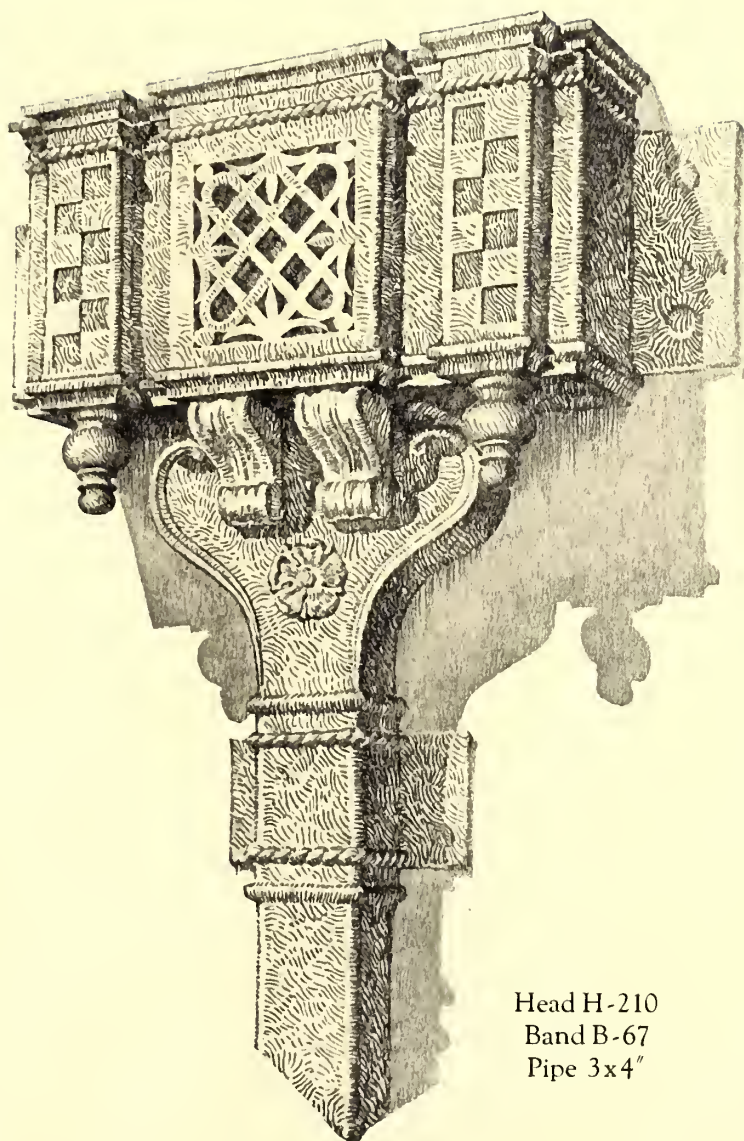
*Rough Cast* gutter is made from HOYT HARDLEAD cast sheets with a rough surface finish to correspond with the rough cast conductor pipe. This type of gutter can be made to any size or shape and ornamented in accordance with architect's details.

*Rolled Sheet* gutter is made from HOYT HARDLEAD rolled sheets in two types as herein illustrated.

CONDUCTOR BANDS are manufactured in several designs as herein illustrated and can be obtained in any design and finish in accordance with the architect's details. These bands are cast of HOYT HARDLEAD in one piece.

For notes on the installation of HOYT HARDLEAD products, see page 32.





Head H-210  
Band B-67  
Pipe 3x4"

*Approximate Dimensions*

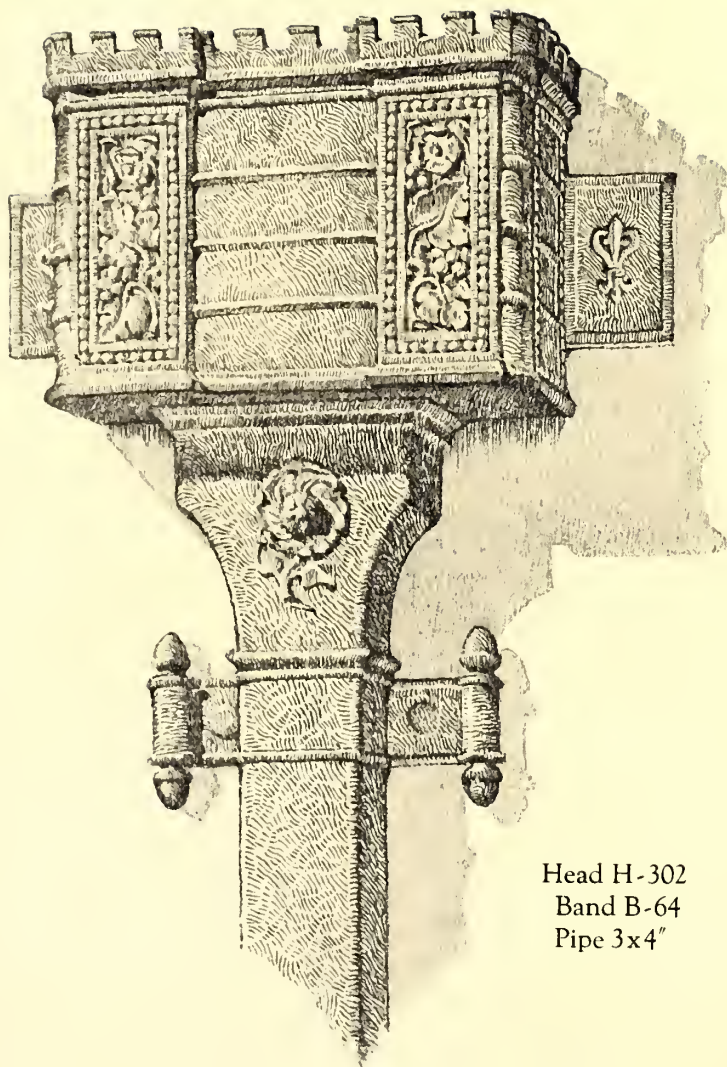
Width at Top 22 $\frac{5}{8}$ "

Projection 6 $\frac{1}{4}$ "

Height 21"

UNITED LEAD COMPANY  
HOYT HARDLEAD PRODUCTS DIVISION  
111 BROADWAY, NEW YORK, N. Y.





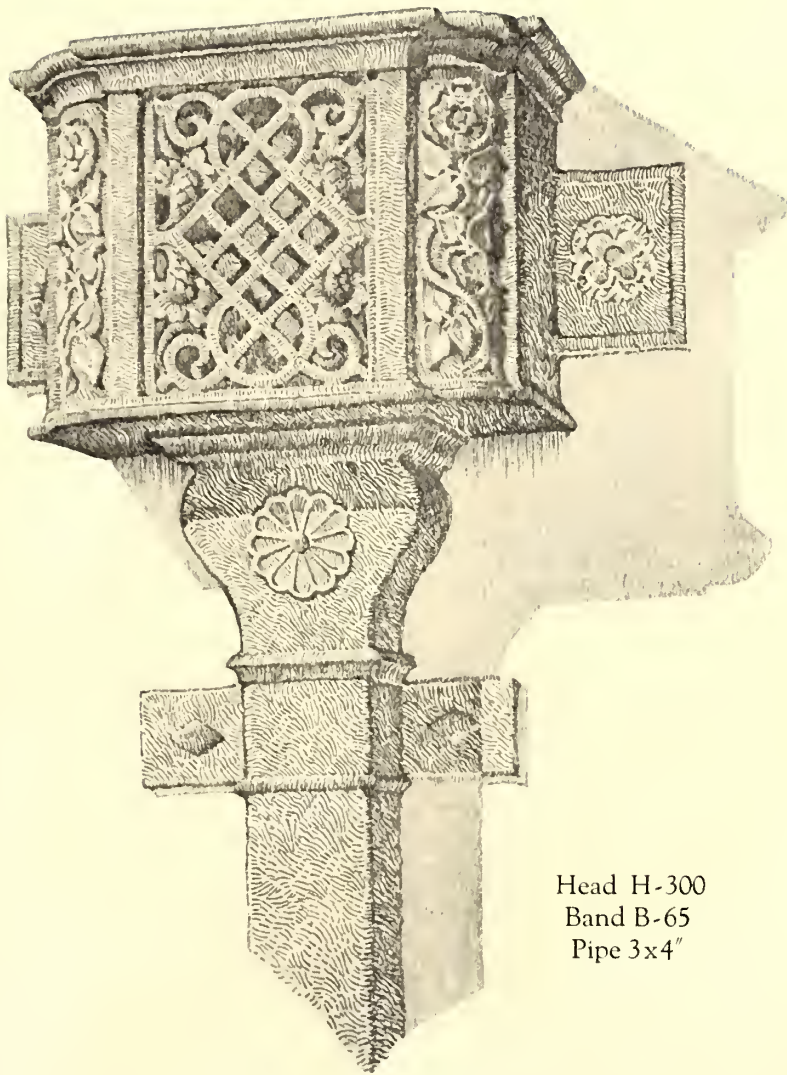
Head H-302  
Band B-64  
Pipe 3x4"

Approximate Dimensions

Width at Top  $17\frac{3}{4}$ "  
Projection 8"  
Height  $21\frac{1}{2}$ "

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HOYT HARDLEAD PRODUCTS DIVISION  
111 BROADWAY, NEW YORK, N. Y.





Head H-300  
Band B-65  
Pipe 3x4"

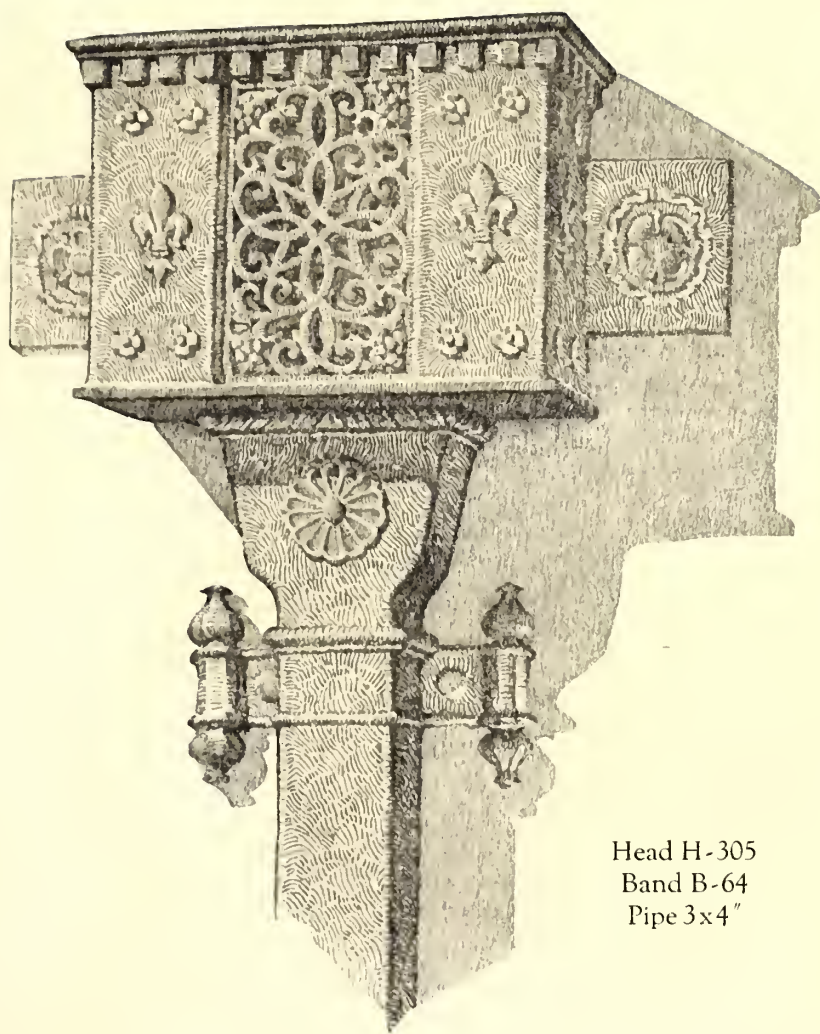
*Approximate Dimensions*

Width at Top 18 $\frac{1}{4}$ "

Projection 10"

Height 20"

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HOYT HARDLEAD PRODUCTS DIVISION  
111 BROADWAY, NEW YORK, N. Y.



Head H-305  
Band B-64  
Pipe 3x4"

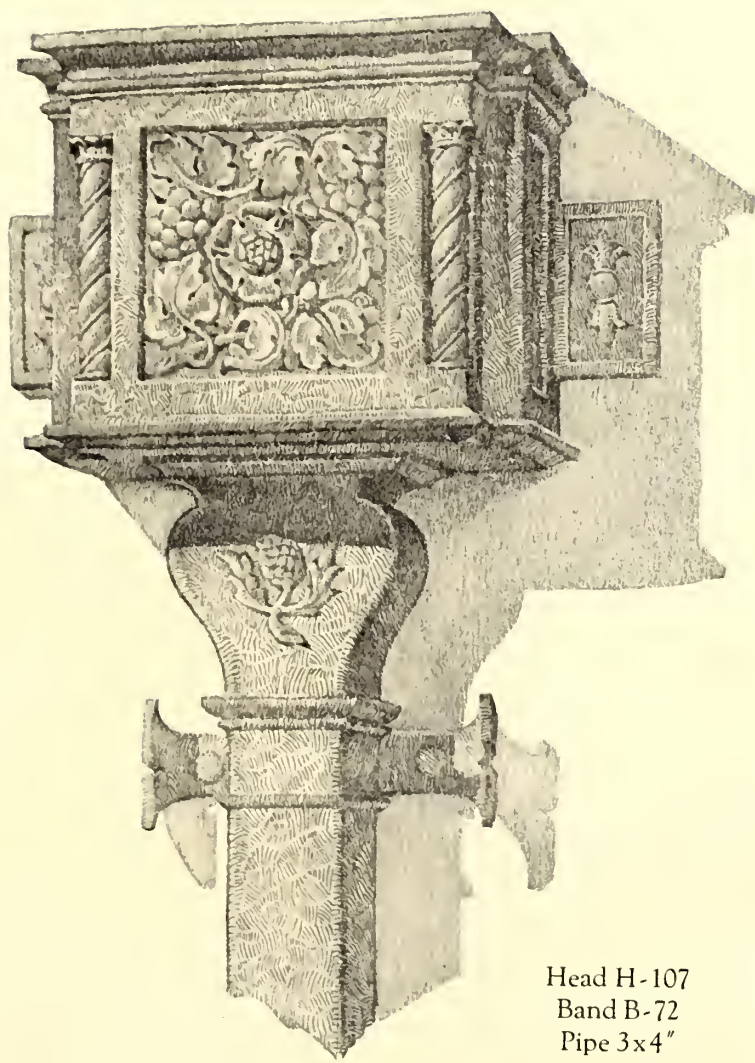
Approximate Dimensions

Width at Top  $17\frac{3}{4}"$

Projection  $7\frac{1}{4}"$

Height  $21\frac{1}{4}"$

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Head H-107  
Band B-72  
Pipe 3x4"

Approximate Dimensions

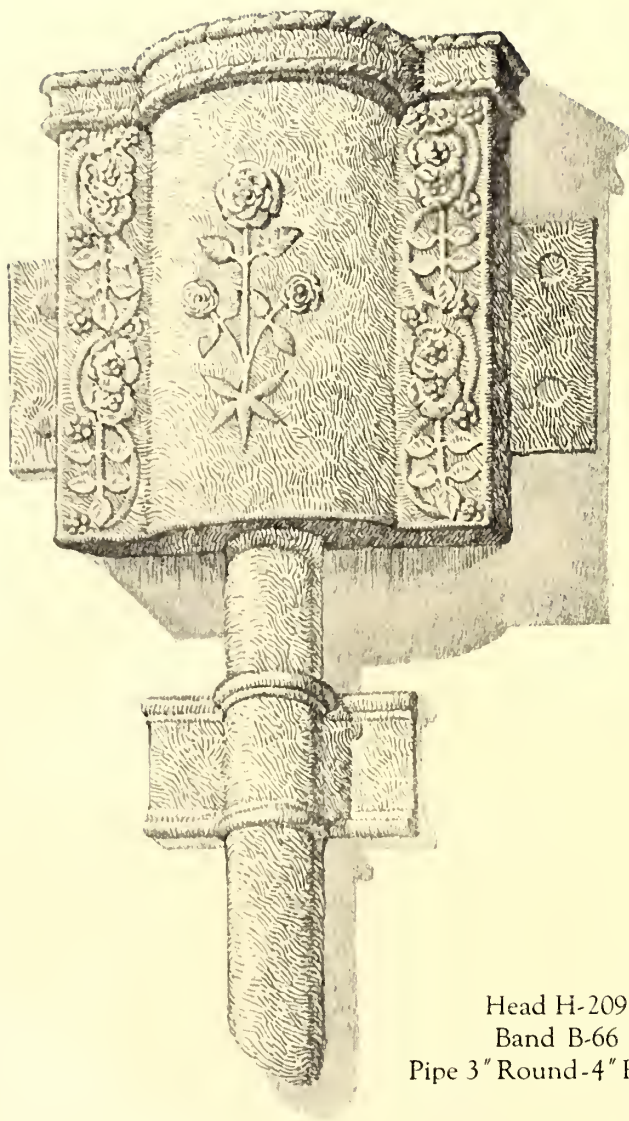
Width at Top  $18\frac{3}{8}$

Projection  $9\frac{3}{8}$ "

Height  $22\frac{3}{4}$ "

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HOYT HARDLEAD PRODUCTS DIVISION  
111 BROADWAY, NEW YORK, N. Y.





Head H-209  
Band B-66  
Pipe 3" Round-4" Round

*Approximate Dimensions*

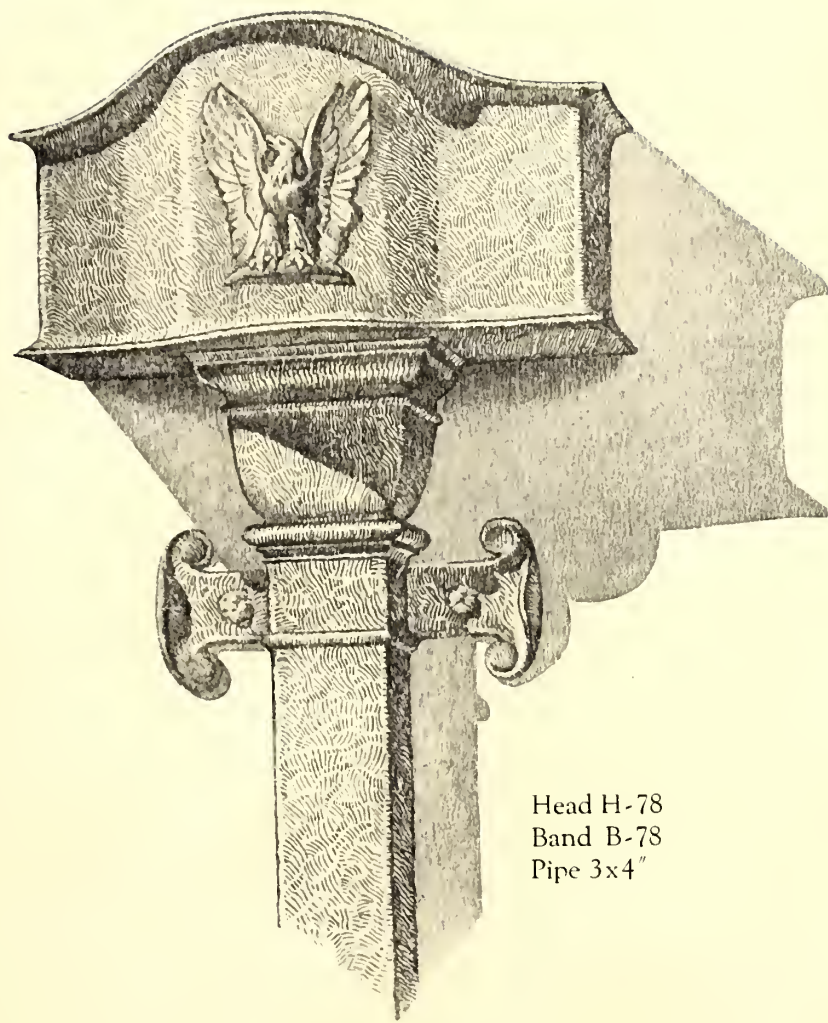
Width at Top  $15\frac{1}{4}"$

Projection  $5\frac{3}{4}"$

Height 15"

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HOYT HARDLEAD PRODUCTS DIVISION  
111 BROADWAY, NEW YORK, N. Y.





Head H-78  
Band B-78  
Pipe 3x4"

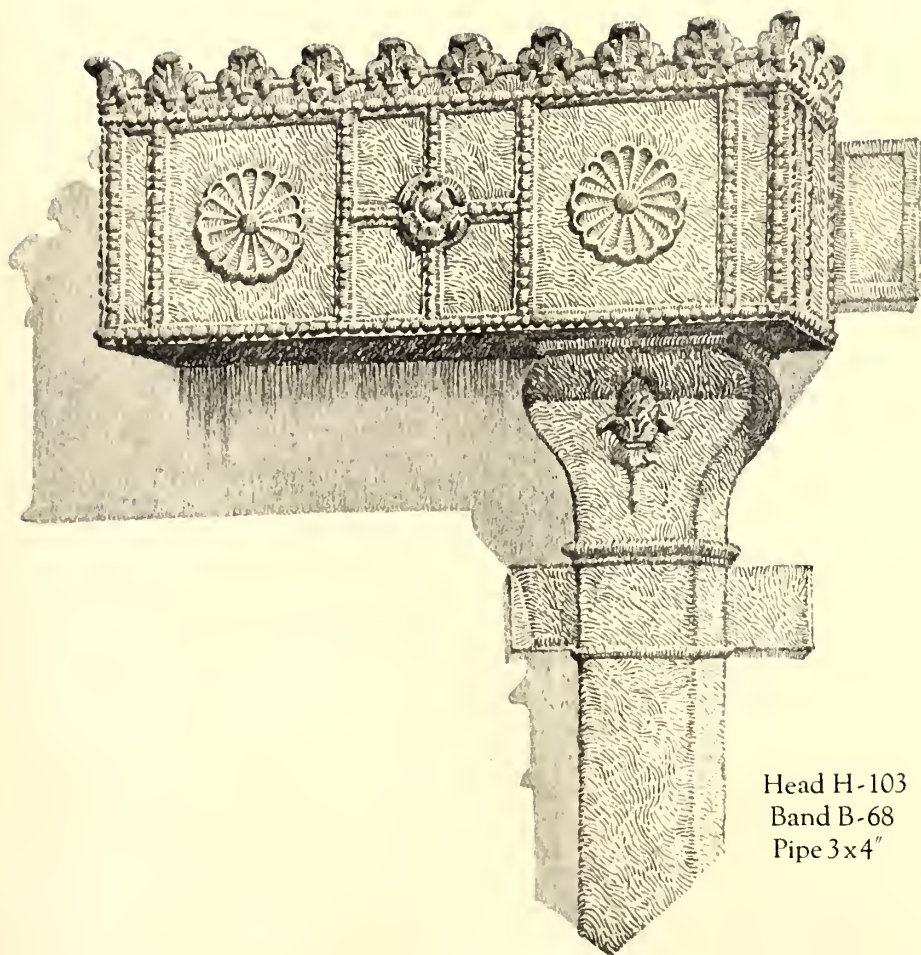
**Approximate Dimensions**

Width at Top  $19\frac{3}{4}$ "

Projection  $9\frac{1}{2}$ "

Height  $16\frac{1}{2}$ "

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HOYT HARDLEAD PRODUCTS DIVISION  
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Head H-103  
Band B-68  
Pipe 3x4"

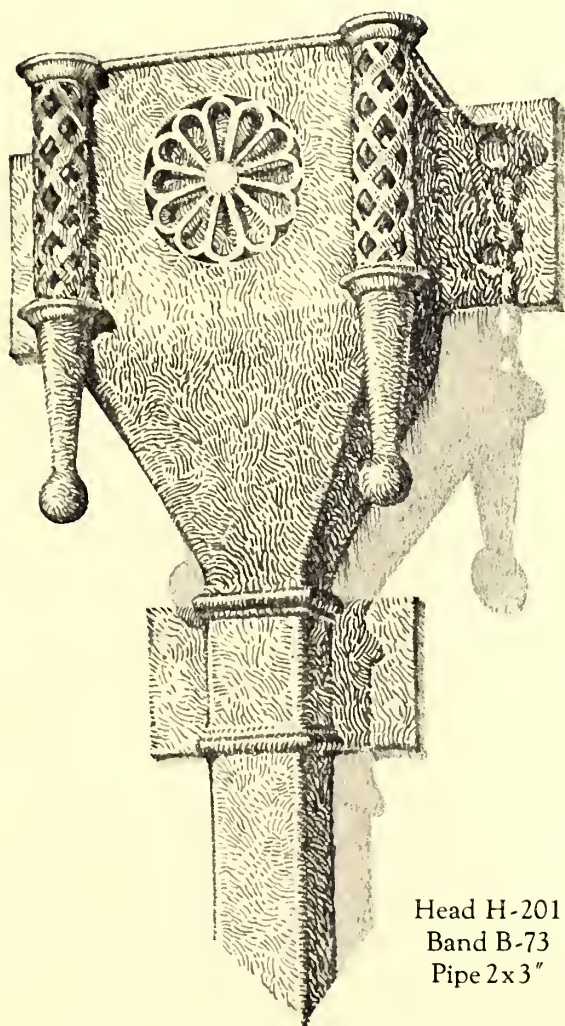
*Approximate Dimensions*

Width at Top 25"

Projection 6"

Height 17"

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Head H-201  
Band B-73  
Pipe 2x3"

Approximate Dimensions

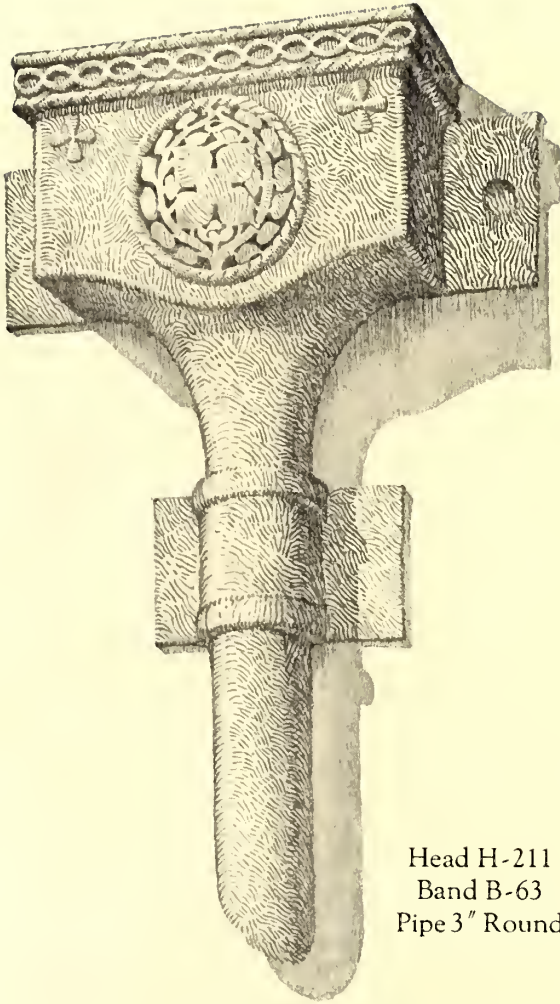
Width at Top  $12\frac{3}{4}$ "

Projection  $7\frac{5}{8}$ "

Height  $15\frac{5}{8}$ "

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Head H-211  
Band B-63  
Pipe 3" Round

Approximate Dimensions

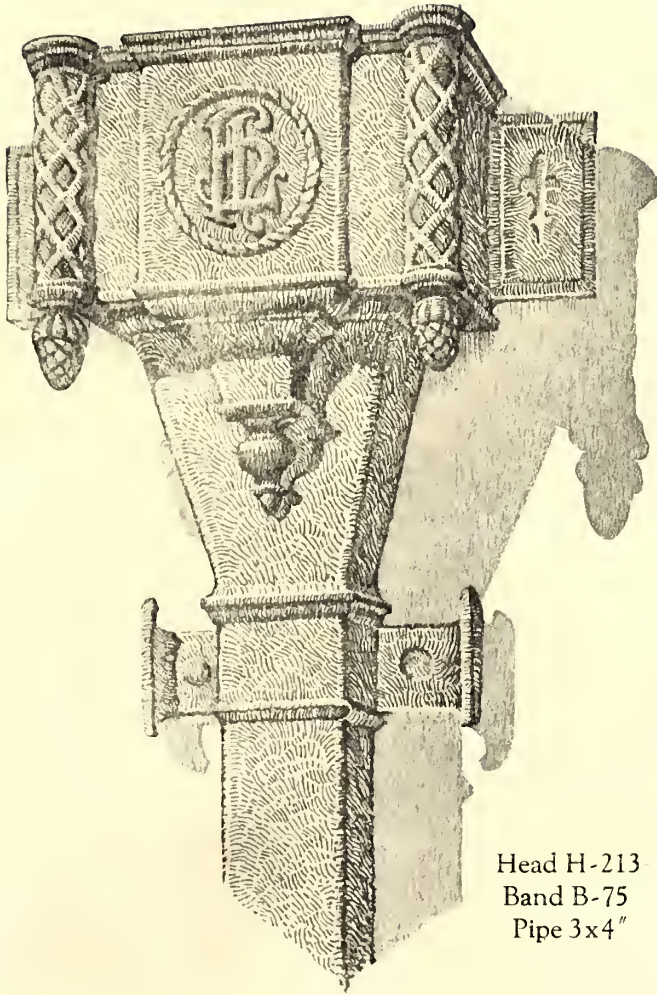
Width at Top  $14\frac{1}{2}$ "

Projection  $5\frac{3}{4}$ "

Height  $13\frac{1}{4}$ "

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Head H-213  
Band B-75  
Pipe 3x4"

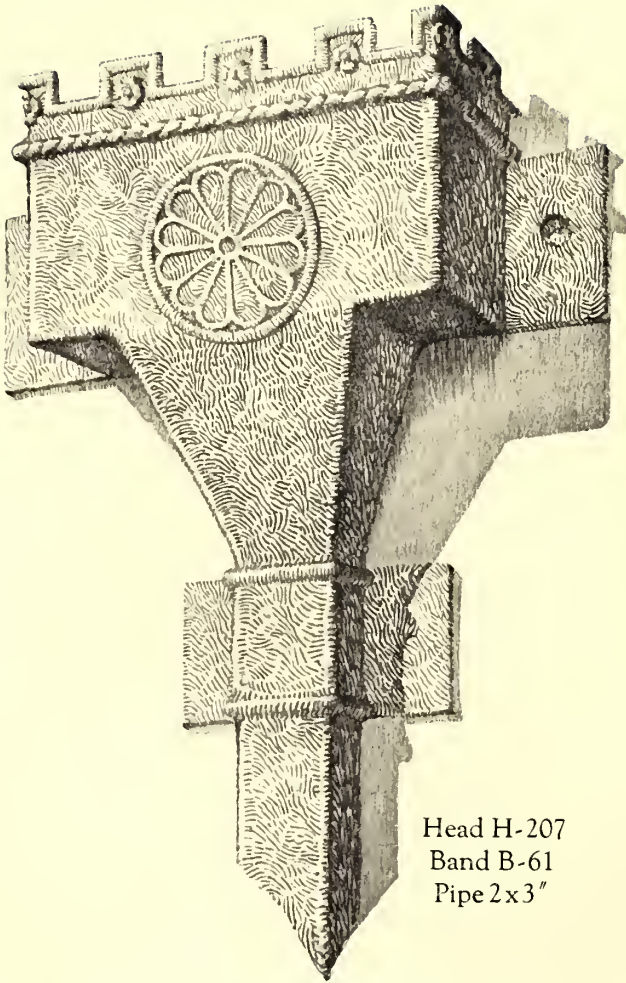
Approximate Dimensions

Width at Top 14 ½"

Projection 7¼"

Height 19"

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Head H-207  
Band B-61  
Pipe 2x3"

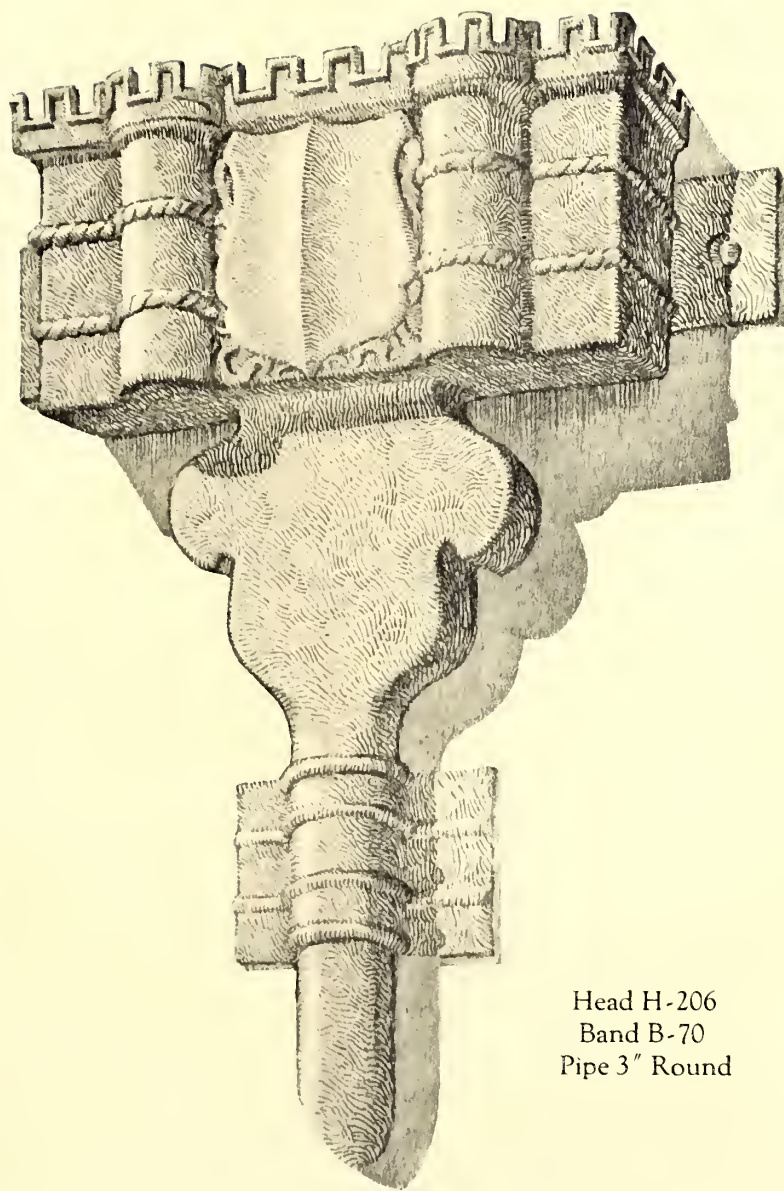
Approximate Dimensions

Width at Top  $13\frac{1}{4}$ "

Projection  $5\frac{3}{8}$ "

Height  $14\frac{5}{8}$ "

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Head H-206  
Band B-70  
Pipe 3" Round

Approximate Dimensions

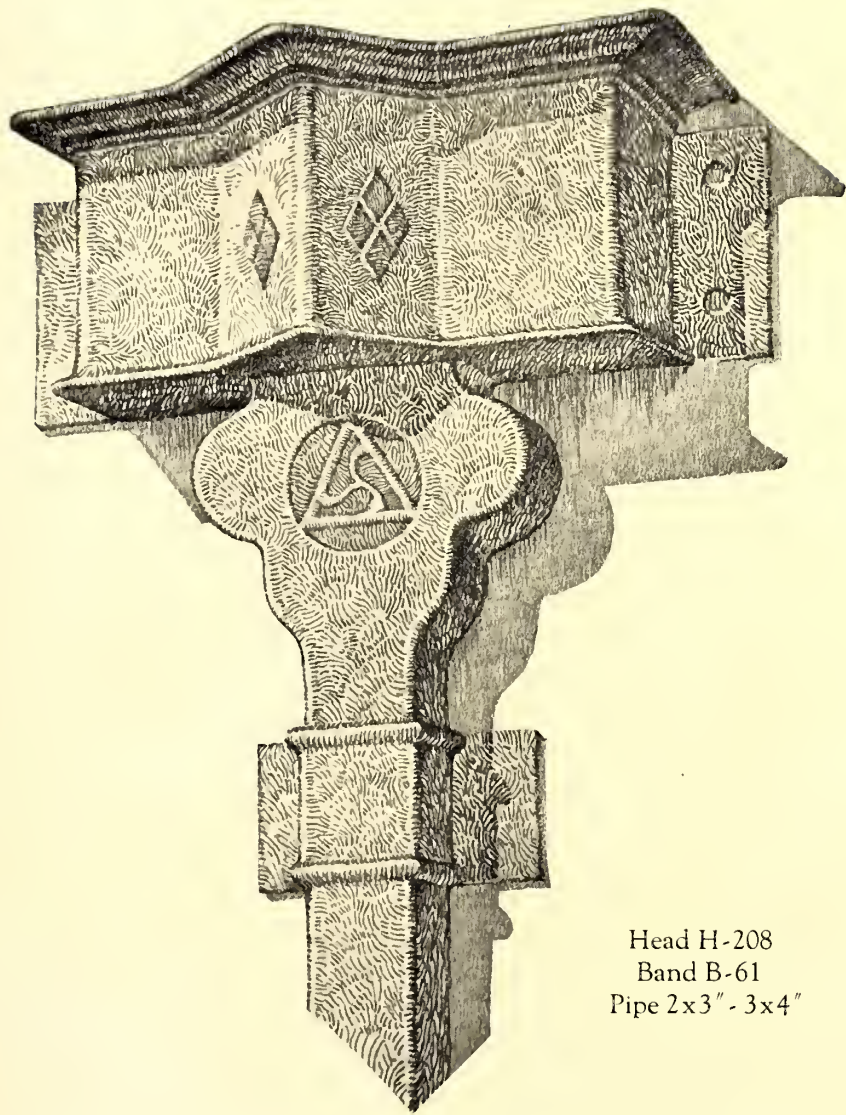
Width at Top  $20\frac{1}{4}$ "

Projection  $7\frac{1}{2}$ "

Height  $21\frac{3}{8}$ "

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Head H-208  
Band B-61  
Pipe 2x3" - 3x4"

Approximate Dimensions

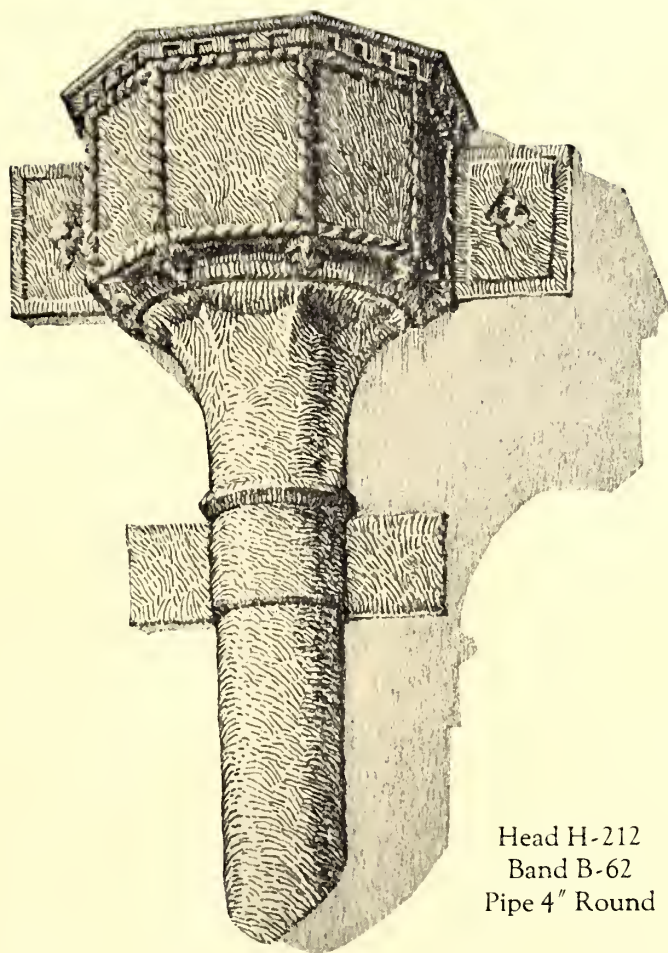
Width at Top  $23\frac{3}{8}$ "

Projection 9"

Height  $20\frac{1}{4}$ "

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Head H-212  
Band B-62  
Pipe 4" Round

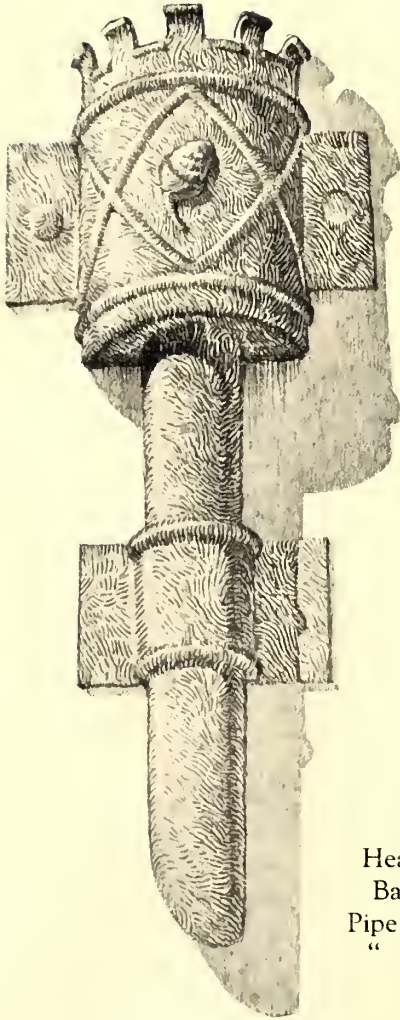
Approximate Dimensions

Width at Top  $13\frac{1}{4}"$

Projection  $6\frac{1}{2}"$

Height  $17\frac{5}{8}"$

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Head H-205  
Band B-71  
Pipe 3" Round  
" 4" "

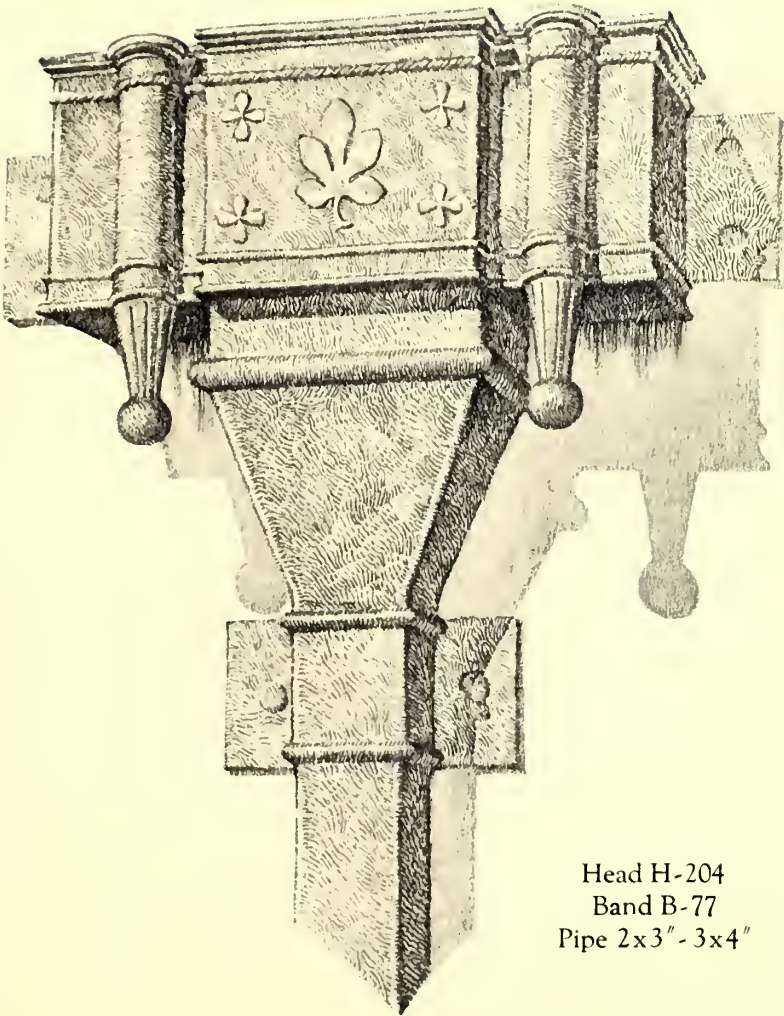
Approximate Dimensions

Width at Top  $7\frac{1}{8}$ "

Projection  $3\frac{5}{8}$ "

Height  $9\frac{1}{2}$ "

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Head H-204  
Band B-77  
Pipe 2x3" - 3x4"

Approximate Dimensions

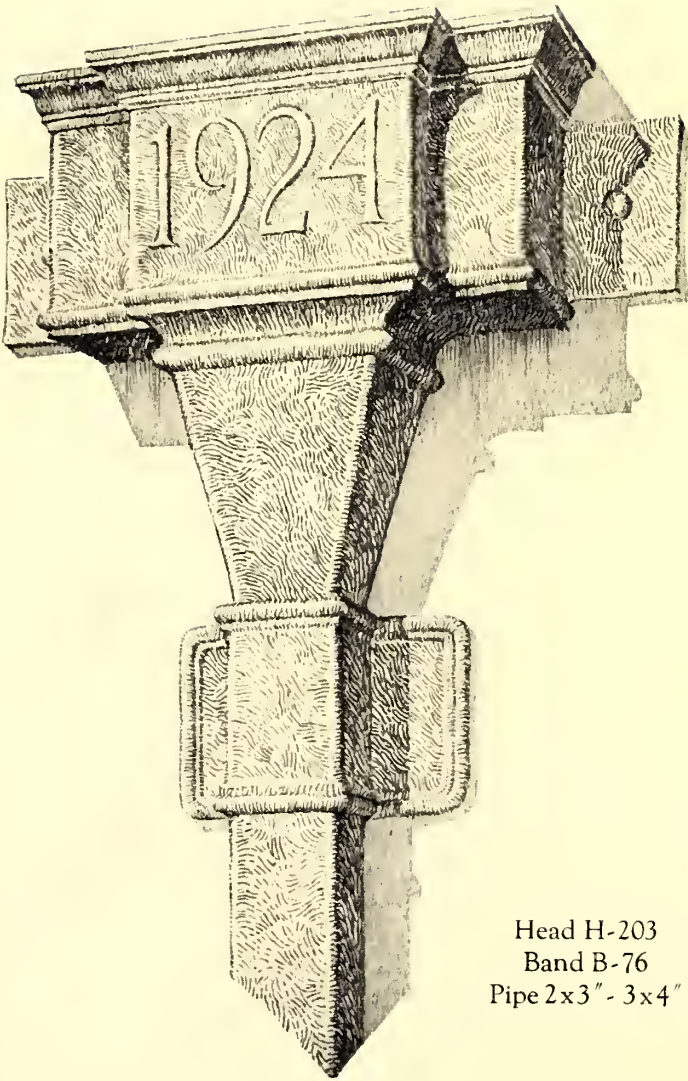
Width at Top  $20\frac{7}{8}$ "

Projection  $7\frac{1}{4}$ "

Height  $18\frac{3}{4}$ "

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Head H-203  
Band B-76  
Pipe 2x3" - 3x4"

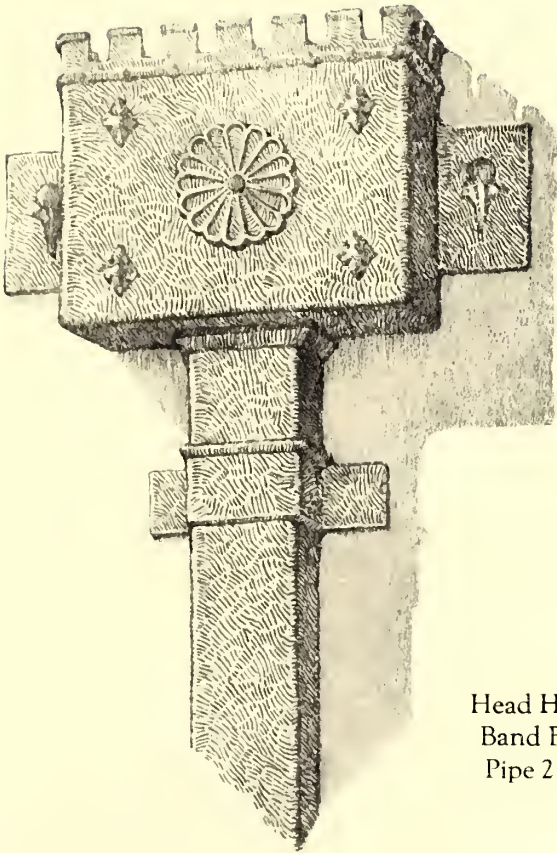
Approximate Dimensions

Width at Top  $17\frac{7}{8}$ "

Projection  $7\frac{1}{8}$ "

Height  $16\frac{3}{4}$ "

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Head H-106  
Band B-69  
Pipe 2x3"

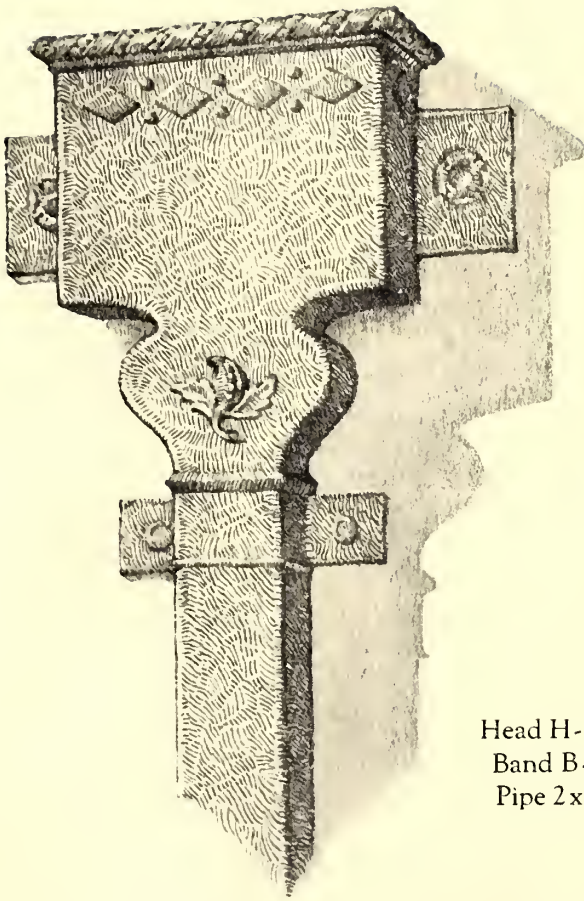
Approximate Dimensions

Width at Top  $12\frac{1}{8}"$

Projection  $4\frac{1}{8}"$

Height  $9\frac{1}{2}"$

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Head H-301  
Band B-74  
Pipe 2x3"

Approximate Dimensions

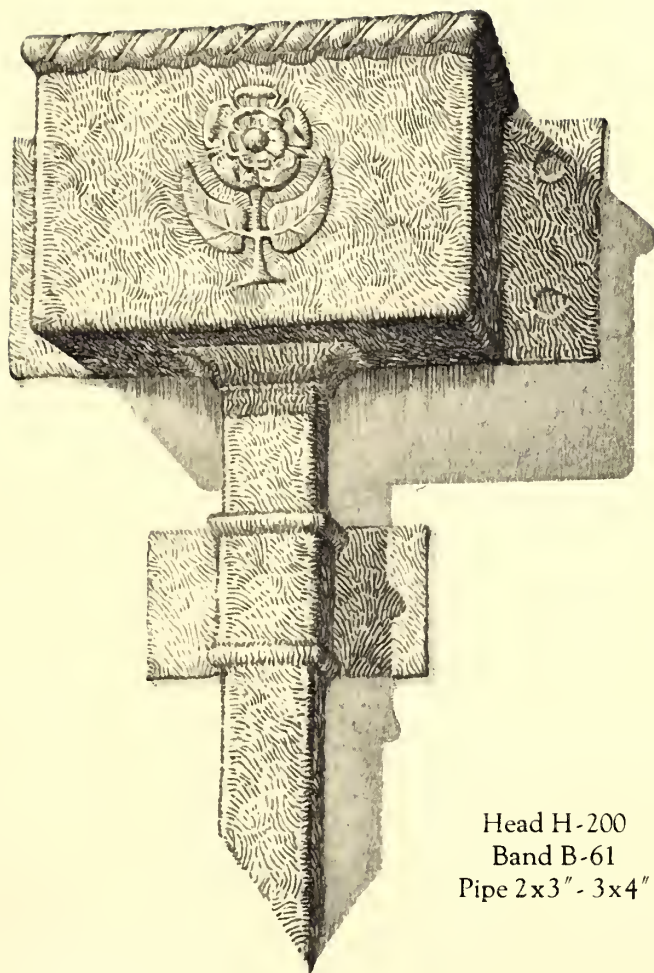
Width at Top  $11 \frac{1}{2}$ "

Projection 3"

Height  $14 \frac{5}{8}$ "

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Head H-200  
Band B-61  
Pipe 2x3" - 3x4"

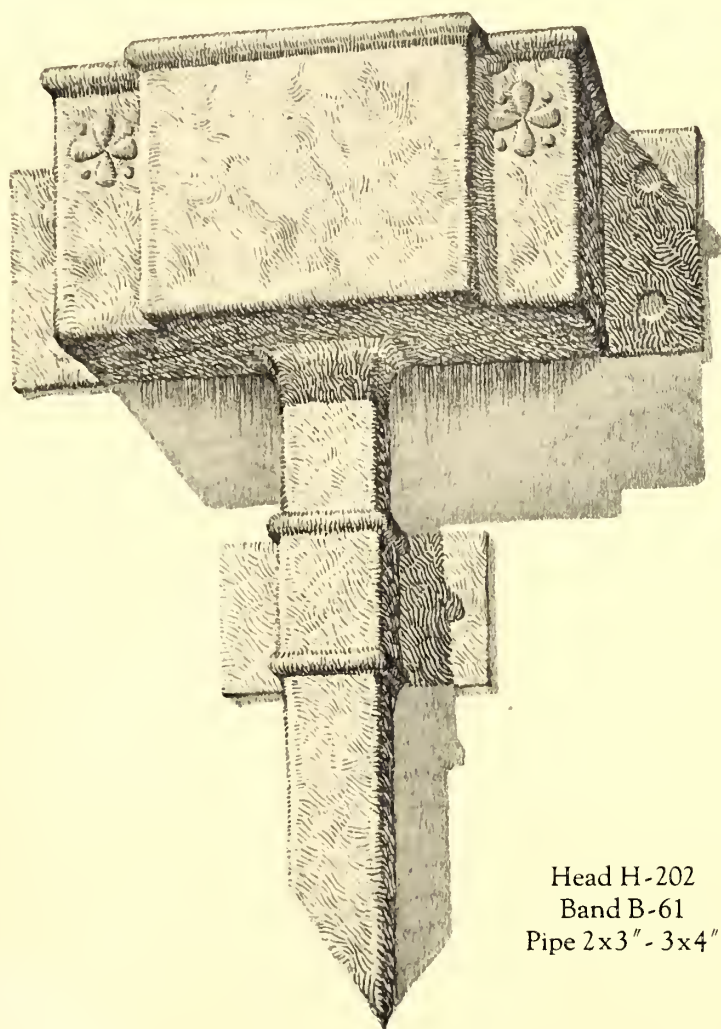
Approximate Dimensions

Width at Top 14"

Projection 6"

Height 9"

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Head H-202  
Band B-61  
Pipe 2x3" - 3x4"

**Approximate Dimensions**

Width at Top 17"

Projection  $6\frac{1}{2}$ "

Height  $8\frac{1}{2}$ "

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## Rough Cast Sheet Gutters



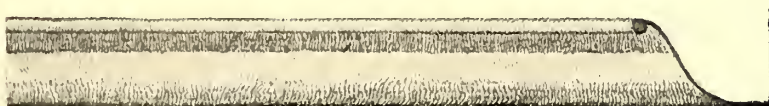
G-30



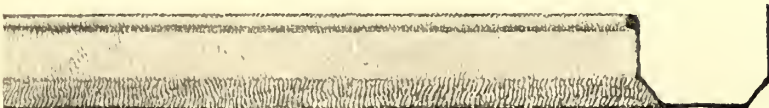
G-31



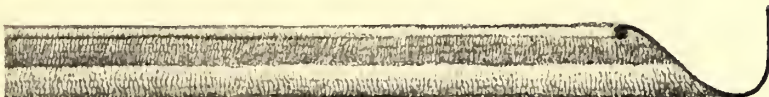
G-32



G-33



G-34



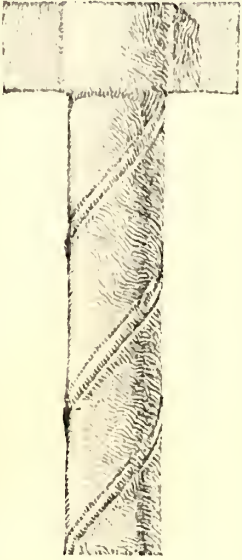
G-35

Scale Approximate:  $1\frac{1}{2}'' = 1'$

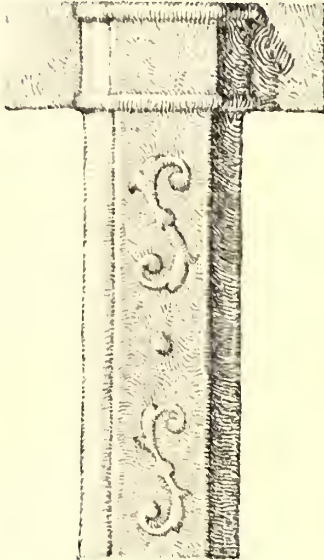
UNITED LEAD COMPANY  
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111 BROADWAY, NEW YORK, N. Y.



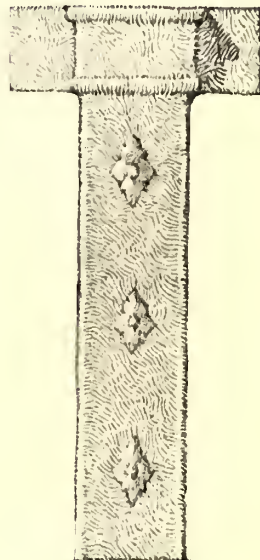
# Rough Cast Ornamental Leader Pipe



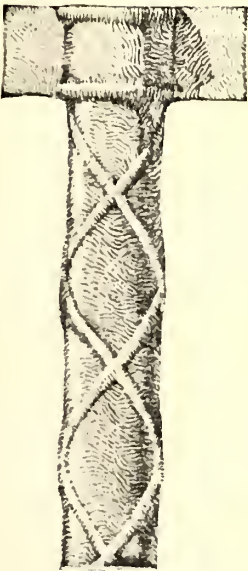
L-60



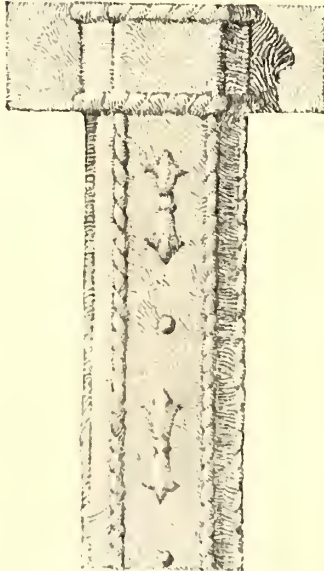
L-62



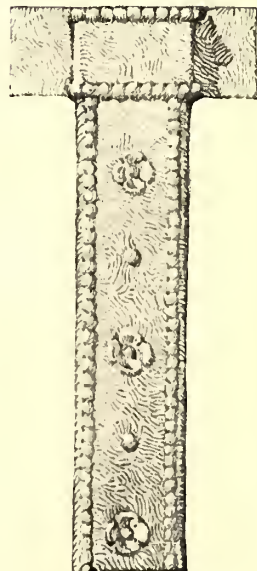
L-64



L-61



L-63



L-65



3" Round  
4" Round



3x4"



2x3"  
3x4"

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HOYT HARDLEAD PRODUCTS DIVISION  
111 BROADWAY, NEW YORK, N. Y.



H-64 (Corner)

Approximate Dimensions

Width  $8\frac{1}{8}$ "

Projection  $10\frac{1}{2}$ "

Height  $18\frac{1}{2}$ "

Conductor Pipe 3" Octagonal

" " 3" Round

" " 3" Square



H-65

Approximate Dimensions

Width 13"

Projection  $14\frac{3}{8}$ "

Height  $20\frac{1}{4}$ "

Conductor Pipe  $2\frac{1}{2}$ " x  $4\frac{1}{4}$ "



H-66

Approximate Dimensions

Width  $15\frac{3}{4}$ "

Projection 11"

Height  $22\frac{3}{4}$ "

Conductor Pipe  $2\frac{1}{2}$ " x  $4\frac{1}{4}$ "

" " 3" x 4"

" " 4" Octagonal

" " 4" Round



H-69

Approximate Dimensions

Width  $9\frac{1}{2}$ "

Projection  $5\frac{3}{4}$ "

Height  $11\frac{1}{2}$ "

Conductor Pipe  $2\frac{1}{2}$ " x  $4\frac{1}{4}$ "

UNITED LEAD COMPANY  
HOYT HARDLEAD PRODUCTS DIVISION  
111 BROADWAY, NEW YORK, N. Y.



H-60

Approximate Dimensions

Width 8"

Projection 5"

Height 7 1/2"

Conductor Pipe 2 1/2" x 3 1/4"

" " 2 1/2" x 4 1/4"



H-61

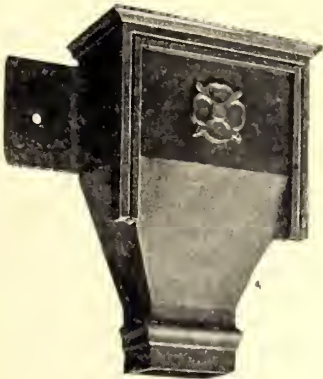
Approximate Dimensions

Width 10"

Projection 6"

Height 7"

Conductor Pipe 2 1/2" x 3 1/4"



H-62

Approximate Dimensions

Width 8 1/8"

Projection 5 1/4"

Height 11"

Conductor Pipe 2 1/2" x 3 1/4"

" " 2 1/2" x 4 1/4"

" " 4" Round



H-63

Approximate Dimensions

Width 10 7/8"

Projection 7 1/4"

Height 11 1/2"

Conductor Pipe 2 1/2" x 3 1/4"

" " 2 1/2" x 4 1/4"

" " 3 1/2" Square

" " 4" Round

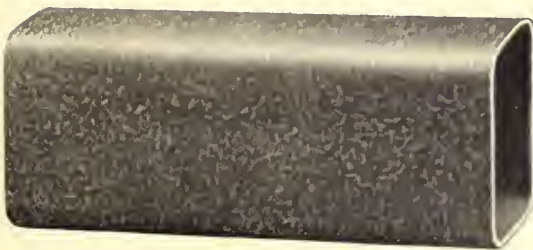
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111 BROADWAY, NEW YORK, N. Y.



## HOYT HARLEAD SEAMLESS CONDUCTOR PIPE



3" Round  
4" "

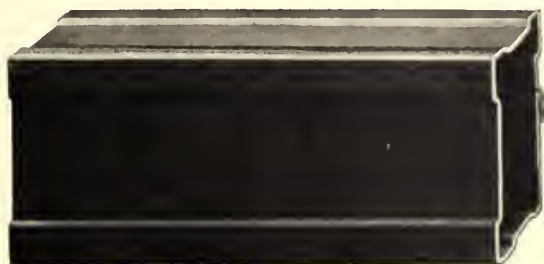


2" x 2" Square  
2" x 3" Rectangular  
2 1/2" x 3 1/2" "  
3" x 4" "

STANDARD LENGTH OF PIPE SIX FEET

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# Hoyt Hardlead Rolled Sheet Conductor Pipe



SIZES

- L-5 2" x 2"
- L-6 3 1/2" x 3 1/2"
- L-1 2 1/2" x 3 1/4"
- L-2 2 1/2" x 4 1/4"



SIZES

- L-3 3" Diameter
- L-4 4" Diameter



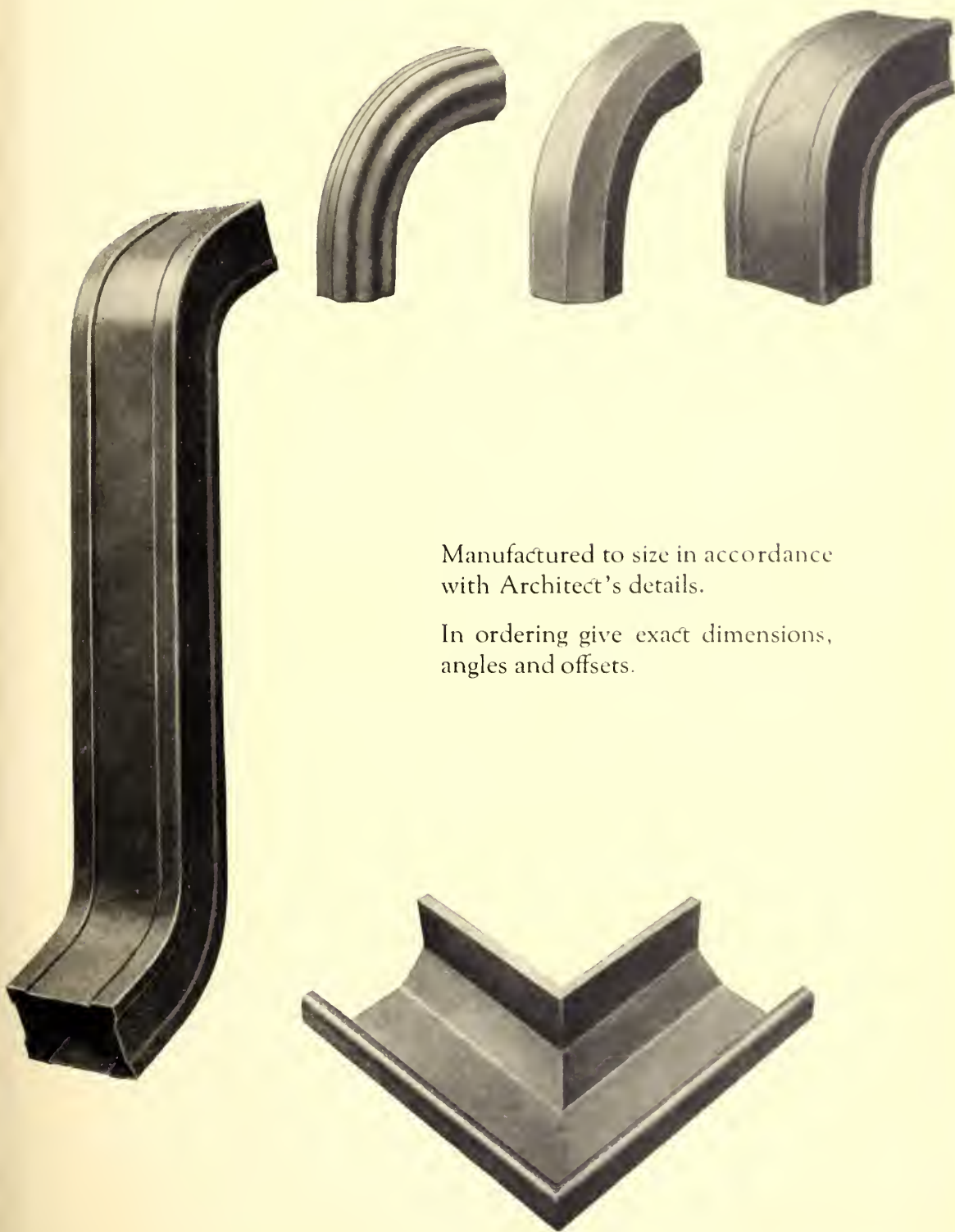
SIZES

- L-8 3" Diameter
- L-9 4" Diameter

STANDARD LENGTH EIGHT FEET

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111 BROADWAY, NEW YORK, N. Y.

## Hoyt Hardlead Goosenecks, Miters and Elbows



Manufactured to size in accordance  
with Architect's details.

In ordering give exact dimensions,  
angles and offsets.

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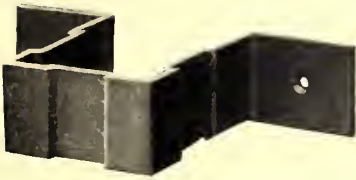
## Hoyt Hardlead Cast Conductor Bands



B-40 Conductor 2" x 2"

B-41 " 2 1/2" x 3 1/4"

B-42 " 2 1/2" x 4 1/4"



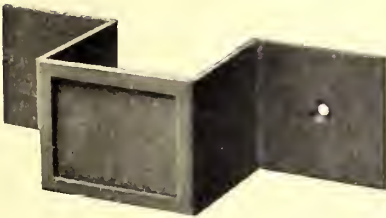
B-46 Conductor 2 1/2" x 3 1/4"

B-47 " 2 1/2" x 4 1/4"



B-44 Conductor 3" Dia., Corrugated

B-45 " 4" " "



B-53 Conductor 2 1/2" x 3 1/4"

B-54 " 2 1/2" x 4 1/4"

B-55 " 3 1/2" x 3 1/2"



B-43 Conductor 3" Dia., Octagon

B-57 " 4" " "

## Lead-Coated Brass Bolts and Screws

Size of Screws 1 1/4" - 1 1/2" - 2"

Expansion Bolts 3/8" x 2 1/2"

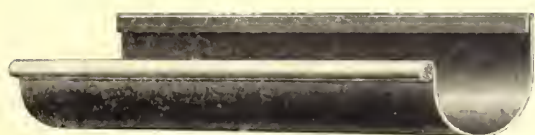
" " 1/2" x 3 1/2"

" " 5/8" x 4"



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## Hoyt Hardlead Rolled Sheet Hanging Gutter



### SIZES

G-20	3"	Half Round
G-21	4"	" "
G-22	5"	" "
G-28	6"	" "

REINFORCED BEADED EDGE



### SIZES

G-26	3"	Octagonal
G-23	4"	" "
G-24	5"	" "
G-25	6"	" "

REINFORCED BEADED EDGE

STANDARD LENGTHS EIGHT FEET

UNITED LEAD COMPANY  
HOYT HARDLEAD PRODUCTS DIVISION  
111 BROADWAY, NEW YORK, N. Y.

# Lead-coated Copper Hangers for Hoyt Hardlead Gutters

**Rolled Sheet Gutters.** Hanger made in one piece with movable clip at back. Half-round or octagon design, Sheathing or Fascia type, as required. Furnished straight and can be bent to conform with pitch of roof.

Cat. No.	Size	Style
G-H 100	3"	Half-Round
G-H 101	4"	"
G-H 102	5"	"
G-H 103	6"	"
G-H 104	3"	Octagon
G-H 105	4"	"
G-H 106	5"	"
G-H 107	6"	"

Similar type of Hanger can be adapted for Cast Gutters, Catalogue No. G-33-34 and 35. Shown on Plate No. 23.

**Double Bead Gutters.** Three-piece hanger, half-round or octagon design. This hanger can be adapted for gutters with outside bead.

Cat. No.	Size	Style
G-H 108	3"	Half-Round
G-H 109	4"	"
G-H 110	5"	"
G-H 111	6"	"
G-H 112	3"	Octagon
G-H 113	4"	"
G-H 114	5"	"
G-H 115	6"	"

**Cast Gutters.** Catalogue No. G-30, 31 and 32. Shown on Plate 23. Furnished straight and can be bent to conform with pitch of roof.

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HOYT HARDLEAD PRODUCTS DIVISION  
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# Hoyt Hardlead Sheets for Roofing

*IMPORTANT*—To insure the use of proper materials, correct weights and expert workmanship, specify as follows:

ALL HOYT HARLEAD SHEETS, LEADER HEADS, LEADER PIPE, LEADER BANDS, GUTTERS, GOOSENECKS SHALL BE MANUFACTURED BY THE UNITED LEAD COMPANY  
111 BROADWAY, NEW YORK, N. Y.

*HOYT HARLEAD* is made especially for roofing purposes and must not be confounded with soft lead. It can be used for flashings, cornice coverings, gutter linings, roofing and other building purposes where it is practical to use sheet metal.

It is rolled in sheets 24", 30" and 36" wide and 90" long weighing 2½, 3, 4, 6 and 8 pounds to the square foot.

## Notes on the Installation of Hoyt Harlead

It is not the purpose of these notes to establish standard methods of solving all the problems met with in sheet metal construction but to call attention to the more important principles that govern good installation. The most important principle to be observed in the design and installation of sheet metal is the law of expansion and contraction. All metals subjected to varying ranges of temperature will expand and contract and proper and sufficient allowance must be made for the movement of the metal. While there are several methods of successfully installing sheet metal under identical conditions the law of expansion and contraction must be observed and applied to whatever method is used.

## Material

*WEIGHTS TO BE USED.* The proper weight of Hoyt Harlead sheets depends upon the purpose for which they are to be used. For gutter linings, cornice coverings, base flashings and roofing purposes generally, the three pound sheet is recommended and for cap flashings and batten roofs where the battens are spaced eighteen inches or less on centers the two and one-half pound sheet may be used.

*SIZES TO BE USED.* For cap flashings and batten caps, the sheets can be used in eight foot lengths but for all other purposes the length of the sheets should be limited to four feet.

*CARE OF MATERIAL.* In handling HOYT HARLEAD reasonable care should be taken not to score or bruise the metal and the use of sharp edged tools and instruments should be avoided.

In bending the metal the brake or tongs should be so adjusted as to accommodate the thickness of the metal and the bend rounded to a radius at least equal to the thickness of the metal. In no case should the bends be sharp.

## Preparation of Surfaces

The surfaces upon which the metal is to be applied should be firm and smooth. The contractor should be required to examine these surfaces and be held responsible for any damage to the material or defects in the work caused by its application to improperly prepared surfaces.

*WOOD SURFACES.* Sheathing boards should be thoroughly nailed to every bearing and the nail heads should be set. All sharp corners and projections should be planed to a smooth surface. Wood battens should be firmly secured in place and the exposed edges slightly rounded.

*CONCRETE SURFACES.* Concrete, masonry or similar material should be screeded to a smooth surface free from depressions or projections.





**SLEEPERS.** Where the surface is of concrete, it is recommended that dove-tail wood sleepers be built into the concrete at the line of all horizontal seams. This will provide means for nailing the cleats and avoid the necessity of drilling the concrete for lead shields and screws.

**FELT.** Sloping roofs, cornice tops and built-in gutters should be first lined with a good building felt weighing from thirty to forty pounds to the square. This precaution will take up slight inequalities in the surfaces and prevent possible puncturing of the metal.

## Fastening and Supporting

While the metal should be firmly supported it should be so fastened in place that it can expand and contract without unduly straining the metal, the joints or the fastenings.

**NAILING.** Fastening the metal by nailing directly through the sheet should never be permitted as the movement of the metal due to expansion and contraction will either pull out the nails or tear the metal around the nail heads.

**FASTENING AT THE SEAMS.** The sheets should be fastened at all seams by means of cleats. These cleats should be made of 16-oz. soft rolled copper or 3-pound Hoyt Hardlead, fastened to woodwork with two hard copper wire nails and to masonry with brass screws and lead shields. The cleats should be spaced about eight inches on centers but on steep roofs continuous cleats for the horizontal joints are recommended.

**REGLETS.** Where the edge of the metal is fastened by means of a reglet there should be a continuous cleat of three-pound Hoyt Hardlead caulked into the reglet and the sheet should be locked to the reglet. Never caulk the sheet into the reglet.

**UNFASTENED FREE EDGES.** Where the edge of the metal is unfastened, such as cap flashings and similar conditions where a lapped joint is provided, the free edge of the metal should be hemmed about one-half inch.

**NAILS, SCREWS, ETC.** All nails should be hard copper wire flat head nails not less than three-quarters of an inch long. All screws should be of brass and all shields of lead. Iron or steel nails and screws, coated or uncoated, should not be used.

## Joints

The sheets should be joined together by means of locked seams. Lapped and soldered seams are not recommended.

**SEAMS.** The seams should have a turnover of three-quarters of an inch and there should be a clearance between the edge of one sheet and the bend in the other of one-eighth of an inch; the seams should be neatly locked but should not be hammered down tight.

**SOLDERING.** The seams on roofs having a pitch of 3 inches or more to the foot and seams three inches or more above the overflow line of gutters do not require soldering but in built-in gutters and on any surface below the overflow line of the gutter, the seams should be soldered. In soldering HOYT HARDLEAD use guaranteed Fifty-Fifty Solder and Rosin as a flux. Care should be taken not to heat the soldering iron to a temperature sufficient to burn the lead.



**BENDS.** All bends should be made with an easy radius and all sharp angles avoided. Where the metal turns up on a wall, curve, batten, or other vertical or sloping surface, there should be a clearance for contraction and expansion between the bend in the metal and the surface upon which it turns up of at least 3 times the thickness of the metal.

**VERTICAL SURFACES.** Where the lead is extended up on a vertical surface more than eighteen inches high, horizontal seams not more than eighteen inches apart should be provided and the sheets supported with cleats at the seams.

## Built-In Gutters

The lining of so-called built-in gutters with metal is a problem that requires the most careful thought in both design and installation. All kinds of metal have been used for this purpose but regardless of the metal used many failures have occurred.

The bottoms of wide, flat gutters that require one or more longitudinal seams should not be lined with metal except under the most favorable conditions and then only by competent mechanics under the direction of an experienced sheet metal contractor. A great deal of trouble may be avoided by treating the bottoms of such gutters in the same manner as a flat roof, flashing the front and back with lead, waterproofing the bottom and covering the waterproofing with promenade tile.

Methods of lining this type of gutter cannot be standardized to the extent of applying identical methods to all installations. The proper method to be employed depends upon the size and shape of the gutter and often on climatic conditions. There are, however, a few simple rules that should be observed in the design and installation of all built-in gutters.

The gutter should be no deeper or wider than is necessary to provide proper drainage. There is nothing to be gained by excessive depth or width in a box gutter.

A pitch of one-half inch or more to the foot is desirable and should be provided where possible.

The best metal to use for this purpose is crimped HOYT HARDLEAD weighing not less than three pounds to the square foot. The sheets running parallel with the gutter should not be over four feet in length nor should they have a girth of more than twenty-four inches.

Every possible precaution should be taken to provide for the movement of the metal due to expansion and contraction. Expansion joints should be provided at all high points. Metal forming the back of the gutter should be joined to the roofing or eaves flashing with a loose-locked seam at least three inches above the overflow line of the gutter and the metal forming the front of the gutter should be joined to a continuous cleat by means of a loose-locked seam. The metal should be fastened in place at the cross seams with cleats as previously mentioned. All sharp angles should be avoided.

## Ornamental Lead Work

**STAMPED WORK.** Where spandrels, panels, pilasters and other ornamental lead work is to be stamped, use HOYT HARDLEAD stamping metal weighing not less than four pounds to the square foot.

**CAST WORK.** Where statuary and other ornamental lead work is to be cast, use HOYT HARDLEAD casting metal.



A FEW EXAMPLES  
OF  
Hoyt Hardlead Installations







TRIBUNE TOWER  
THE CHICAGO TRIBUNE

Raymond M. Hood  
John Mead Howells  
Architects

One of the twelve hundred  
spandrels used on this  
building. These spandrels  
were stamped in *one piece* of  
HOYT HARDLEAD.

All flashings and pitched  
roof of three pound HOYT  
HARDLEAD.



Size 33"x38"

Four pounds to the square foot







LEAD STATUARY

INSTALLATION OF HOYT HARDLEAD PRODUCTS

Residence of Robert Law, Port Chester, N. Y.

Dwight James Baum, Architect, Riverdale, N. Y.



HOYT HARDLEAD

GUTTERS, GOOSENECK CONDUCTORS,  
BANDS, CAST LEAD HEADS





HOYT HARDLEAD ROOF  
UNIVERSITY OF MICHIGAN  
Ann Arbor, Michigan  
York & Sawyer, Architects  
New York, N. Y.





HOYT HARDLEAD DOME

University of Michigan

Ann Arbor, Michigan

York & Sawyer, Architects

New York, N. Y.



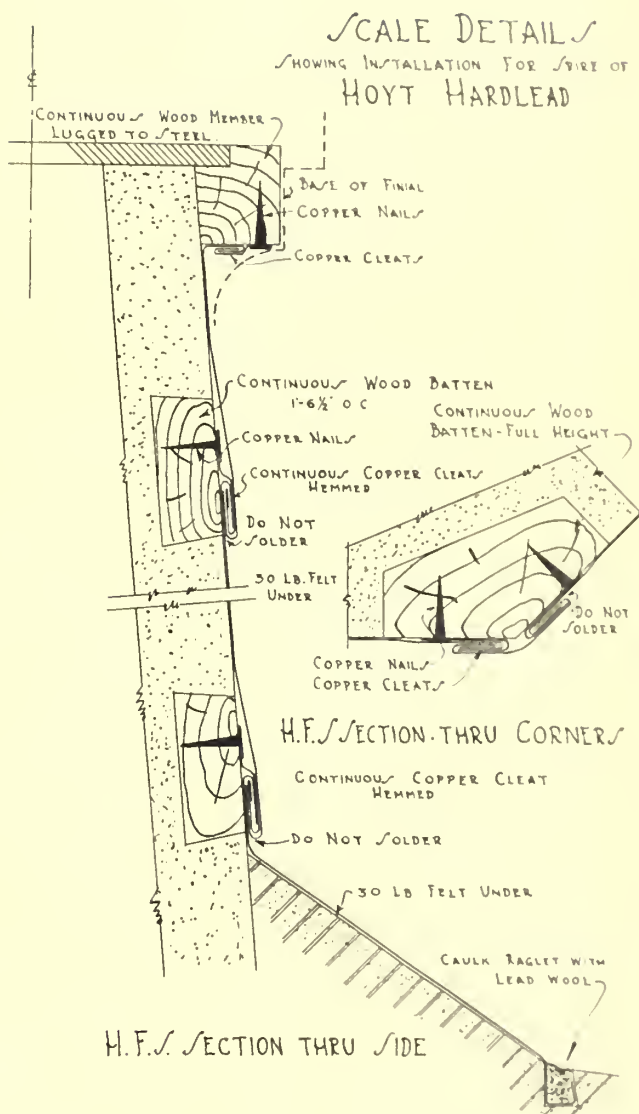






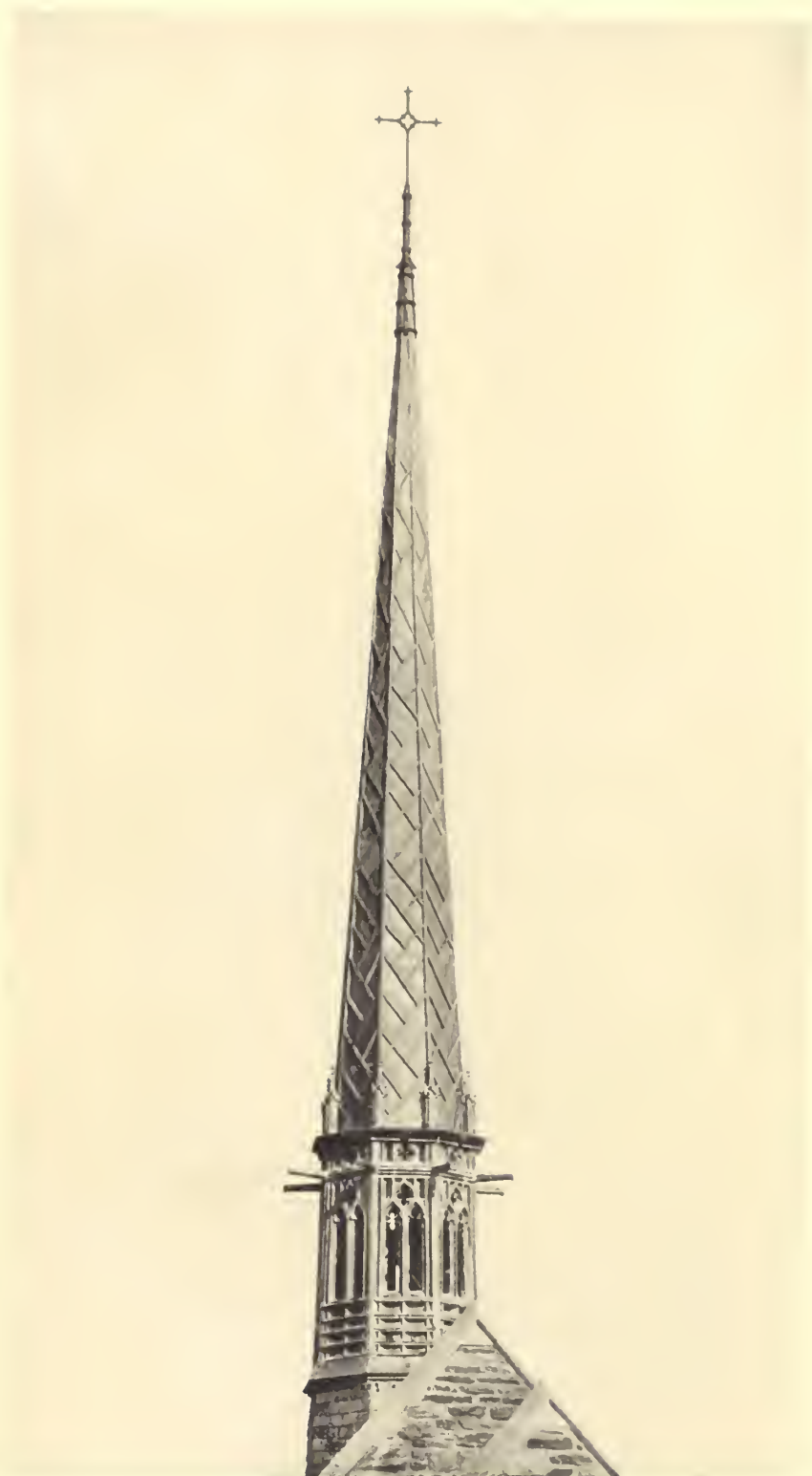
SPIRE OF HOYT HARDLEAD  
First Presbyterian Church, Utica, N.Y.  
Cram & Ferguson, Architects  
Rushmer & Jennison, Associate Architects





HOYT HARDLEAD SPIRE  
CHAPEL BUILDING  
ST. MARY'S-ON-THE-LAKE SEMINARY  
Mundelein, Ill.  
J. W. McCarthy, Architect  
Chicago, Ill.





FIRST PRESBYTERIAN CHURCH  
ARDMORE, PENNSYLVANIA  
Thomas, Martin and Kirkpatrick, Architects





Hoyt Hardlead  
Cast Statuary



Howard Henry and Foulke Dormitory  
PRINCETON UNIVERSITY  
Zantzinger Borie and Medary, Architects  
A. Stirling Calder, Sculptor







